INTERNATIONAL BULLETIN
OF PLANT PROTECTION

1934 No. 8

DISCOVERIES AND CURRENT EVENTS *

French North Africa: Desert and Moroccan Locusts (1).

ALGERIA.

Schistocerca gregaria.

On 3 May 1934 a large yellow and red swarm settled on the north slope of the Kef Seridja 2 to 3 km to the E. of Laghouat and laid over 18 hectares.

On the 5th a large red and yellow swarm coming from the S. E. settled at 5.30 p. m. at Daïat Gueblia on the edge of the Laghouat oasis. Copulation and laying on 6 May over 20 hectares.

Hatching of little importance was reported at Chaabet Sidi Cheikh, Metlili oasis, 30 km to the S. of Ghardaïa.

On the 7th hatching was reported in the region of Tsmad, 75 km to the S. S. W. of Ghardaïa.

On the 8th a red and yellow swarm of 1 × 1 km, coming from the E., settled at 6 p. m. at El Mekeb El Feraâ, near Nili, 56 km S. of Laghouat. Flew away E. at 11 a. m. on the 10th. A few eggs were deposited on the surface of the ground.

On the 12th hopper bands were reported at Drââ Touidjine, near Djamaa, Touggourt.

On the 14th hopper bands were reported at Hassi el Malah, douar of Ouled Saya, Touggourt, and at Koudiat Tarba, near Djamaa, Touggourt.

On the 15th a small yellow swarm coming from the S. settled at 5.30 p. m. at Prise d'Eau, 4 km to the N. of Laghouat. Flew N. at 10 a. m. on the 16th.

Hopper bands were reported at 1 km to the W. of El Berd and at 5 km to the W. of Sisi Yahia, Touggourt.

Small egg deposits were reported over 2 to 3 ares between Guerg and the Oued Feidh El Kelba, 80 km S. of Laghouat.

On the 19th a yellow and red swarm coming from the S. W. settled at 2.30 p. m. at Daïat Ghorbia, 2 km to the S. of Laghouat, and laid over 15 hectares. Practically the whole swarm departed on the 22nd, flying N.

On the 23rd hatching was reported also near Ksar Bousemghoun, Géryville.

* Under this and the next heading the countries are arranged in French alphabetical order.

(1) Communication from the Government General of Algeria, Direction of the Economic Services, to the International Institute of Agriculture.

On the 25th a small swarm settled at Aoud Lahmar, Mescheria and laid over 3 hectares.

On the 26th hatching was reported at El Haouïta, Laghouat.

On the 29th hatching was reported at Seridja, Laghouat.

On the 31st hatching was reported at Daïat Gueblia, Laghouat.

On 2 June 1934 hatching of small but dense egg deposits were reported at the Col des Sables, 1.800 km N. W. of Laghouat.

On the 4th a swarm coming from the S. settled over 5 hectares, in the region of Moghrar, Aïn-Sefra.

On the 5th hatching of small quantities of hoppers was reported 6 km to the S. of the Ksar Chellala, Géryville.

On the 6th scattered hatching was reported on the slopes of the Oued Zerzoun Ksar Arbauoat, Géryville.

On the 9th two large yellow swarms, the first coming from the S. and the second from the S. W., settled at 6 p. m. 3 km from the Ksar d'El Haouïta, 50 km to the N. W. of Laghouat, covering 40 hectares. They departed at 8 a. m. on the 10th, flying N.

On the 14th a medium sized pink swarm coming from the S. E. settled near the Ksar Boualem, 45 km E. of Géryville and flew away to the north.

On the 16th hatching of small quantities of hoppers was reported at Oued Cherika, 55 km S. of Géryville and at Kerakda, 40 km S. of Géryville.

On the 18th a swarm 3 km in length coming from the N. passed at 6 p. m. over Bouaïech, Beni-Ounif, flying S.

Hopper bands were reported at Daïat el Bedâa and Kef Seridja, Laghouat.

On the 24th a swarm of considerable size coming from the N. E. settled in the Saoura.

Dociostaurus maroccanus.

On 1 May 1934 a medium amount of hatching was reported at Feidj el Ahmar, douar Oum el Djellil, Boghari over 2 hectares.

On the 14th hatching was reported at Oumat and Tine, douars of Saneg and Boughzoul, Boghari, over 2 hectares.

On the 15th hatching was reported at Aïn Beïda, douar of Aziz, Boghari over 1 hectare.

On the 17th a small amount of hatching was reported at Aïn Saïd and Ouled Bourenane, Trézel.

On the 19th hatching of medium density was reported at Malah, douar of Boughzoul, Boghari, over 5 hectares, also at Blat, douar of Aziz, Boghari, over 1.5 hectares.

On the 20th a medium amount of hatching was reported at Feidj el Ahmar, douar of Oum el Djellil, Boghari, over 4 hectares.

On the 23rd hatching of medium density was reported at Tsemade and Kef el Ghoula, douar of Boughzoul, Boghari, over 1 hectare.

On the 26th slight hatching was reported at Sidi Madani, Fidjlia and Azzaba, douar of Siouf, Boghari.

Small hopper bands were also reported at the douar of Ouled Zouai, Aïn M'lila.

On the 9th June 1934 a few scattered locusts were reported at Malah, Oumat and Tine, Ghoula, Draa al Abiod, Boughzoul douar, Faidj el Ahmar, Oum el Djellil douar, El Ghoul, Aïn Beïda, Blat, Aziz douar, in the mixed commune of Boghari.

A few isolated hoppers were reported at Sidi Makani, Fidjlia, Azzocba, Sidi Brahim el Hamdi, Siouf douar, in the mixed commune of Boghari.

On the 14th scattered hoppers were reported in the ruins of Zaraa, Ouled Mohammed ben Feroudj douar, Bélezma.

On the 21st copulation and laying by scattered adults took place at different places in the mixed commune of Boghari.

Morocco.

Schistocerca gregaria.

On 20 May 1934 a yellow swarm was circling to the N. E. of Safi.

On 23rd eggs were reported over 1 hectare at the Bastide farm, 25 km. to the S. E. of Safi.

From 28 May to 4 June a vast but scattered swarm was reported 25 km. to the N. E. of Safi.

Angola: Locust Movements (1).

Luanda District. — On 16 March 1934 the first larval bands began to appear in the plain of Icau, civil circumscription of Dande. Numerous breeding areas were noted between Icau and Ucua, especially in the regions of Hove and Tumba.

On the 23rd the holdings of Tentativa, Libongo, Alice and, in general, the whole of the Dande circumscription was noted as being infested by large quantities of eggs and by hoppers in the first stage of development.

On the 24th the first larval bands appeared in the Bengo plain, within the area of the port of Cucuaco, Luanda circumscription.

The civil circumscription of Icolo and Bengo continued to be invaded by larval bands in different stages of development.

Benguela District. — On the 12th a swarm of a brownish-yellow colour flew over Benguela and the orchards of Cavaco. The locusts came from the south and, after settling for half an hour, rose and flew towards the north.

(1) Communication from Mr. Jorge de Barros Rodrigues Queiroz, Agricultural Engineer, Director of the Laboratory for Plant Pathology and Agricultural Entomology, Directorate of the Agricultural and Commercial Services, Luanda, transmitted to the Institute by the Government General of the Colony.

At 9 o'clock on the morning of the 12th a new swarm, brownish-yellow in colour, passed over the town of Benguela from the south and proceeded towards the north.

On the 13th a second swarm with the same characteristics as the first flew over the town of Benguela.

On the 16th the region of Dombe Grande was invaded by a greenish swarm extending approximately over an area of two kilometres. It came from Quilengues and, after settling for two days, proceeded towards the north.

On the 22nd various rather sparse swarms, coming from the south, flew from Benguela to Cassepel.

In the Quilengues circumscription, 26 zones distributed among the residencies of Impulo, Dinde and Tchongoroi were infested by hoppers, this being one of the southern regions of the Colony where the locust invasion has the most serious aspect.

Malange District. — On the 13th a swarm of considerable size, coming from the east, flew in various directions within the boundary of the circumscription of Duque de Braganza and also that of Malange. It proceeded in a southerly direction.

North Quanza District. — In the civil posts of Lucala and the head-quarters of Casengo circumscription, as also in the Cambambe circumscription, various larval bands appeared which, happily, caused no serious damage to the crops.

South Quanza District. — Small swarms of *Nomadacris septemfasciata* flew over the different posts of the civil circumscription of Seles. Hoppers were observed in the posts of Botera and Amboiva, and also in the Angelo Cordillera, post of Conda.

Moxico District. — This district continues to be invaded by many hopper bands in various stages of development. In the frontier circumscription of Cuando the entire area is affected and very serious damage has been done to the native plantations.

Mossamedes District. — Information has been received to the effect that there are large hopper bands in the region of Serra-abaixo.

Bié District. — No appearance of locusts has been reported in the circumscription of Alto Quanza. As regards the remaining circumscriptions no information has been received.

Huila District. — In the circumscriptions of Gambos, Chivia and Bajo Cunene the presence of many hopper bands continues to be reported, notwithstanding the numbers which have been destroyed. Information was received from Bajo Cunene that in the region of Ondonga there are enormous numbers of hoppers from south-east Africa while the respective authorities are taking no measures to avert the damage which will undoubtedly result.

In the Lubango circumscription some larval bands have appeared although, comparatively, they are not dense, only slight damage having been reported owing to the limited number of hoppers.

Lunda District. — In the posts of Luremo, Caluango and Cuango, Camaxilo circumscription various swarms and hopper bands have been observed. In the remaining posts of the circumscription, including Saurimo, no invasion of locusts has been reported.

LOCUST CONTROL CAMPAIGN.

Luanda District. — In Felix & Co.'s holding of Libongo a detachment of 200 soldiers belonging to the 1st Company of native troops, and 100 workmen supplied by the administrator of the civil circumscription of Dande, proceeded to dig trenches for the destruction of a large hopper centre and, with the aid of barriers and six flame-throwers destroyed 5,000 kg. of hoppers and 1,500 kg. of adults.

In Icau, a gang under the command of an official of the Agricultural Services destroyed on 24 March 1,000 kg. of hoppers. The same gang using barriers and flame-throwers decimated 250 bands weighing approximately 10,000 kg., and at the same time destroyed 2,000 kg. of eggs.

In the Tentativa holding, also, hoppers have been destroyed to the extent of some tens of thousands of kilogrammes, utilising for this purpose the services of 300 native day labourers. In the civil post of Bom Jesus, Icolo and Bengo circumscription the destruction of hoppers begun some time earlier is still being carried on.

In the Ambriz circumscription the protective measures undertaken in Tabi and Uezo are continued.

Benguela District. — In the Benguela circumscription, civil post of Luimbale five hopper bands were destroyed, and in the post of Lunge 1,653 kg. of eggs.

Behind the boundaries of the Impulo and Dinde posts and in the region of Bite-Bivar, at the headquarters of the Quelingues circumscription, several tons of adults and various bands of hoppers were decimated by the method of barriers and flame-throwers. Owing to the limited population and the lack of equipment for the campaign, locust control in this region is very difficult, and it is feared that the majority of the hoppers will develop wings before steps are taken for their destruction.

In the Benguela circumscription three gangs were organised for the protection of the agricultural holdings of the Cavaco region.

Malange District. — Civil circumscription of Malange: In the post of Cacuso hoppers to the weight of 7.000 kg. were destroyed by means of barriers and flame-throwers.

In the post of Xissa 124 barriers, 25 metres apart, were constructed, the space between becoming completely filled with hoppers. Flame-throwers were also used in the regions of Seleca and Cuige with most satisfactory results.

In the post of Cagandala the entire area was freed of hoppers by means of barriers.

Circumscription of the Cambo Frontier: Troughout the area of this circumscription many locusts have been destroyed although, notwithstanding the

goodwill shown by the local authorities, it has not been possible to rid the district entirely of the pest.

Circumscriptions of Bondo and Bengala: At the headquarters the inhabitants may congratulate themselves on the extermination of an enormous swarm. This was accomplished with the help of the neighbouring post of Xissa, where, as mentioned above, 500 natives were mobilised for the destruction of locusts in Xissa itself, and entirely exterminated the pest.

In the post "5 October,, many campaigns were undertaken against the hopper bands, the great majority of them being exterminated.

In the post of Lui large numbers of hoppers were destroyed by means of flame-throwers.

Circumscription of Duque de Braganza: The headquarters are regarded as almost free from hoppers. Many adults and hoppers were destroyed in Gulo by means of barriers while, in order to destroy the eggs, it was necessary to pass a plough over the land, so as to expose them.

In Brito Godins, and chiefly in the post of Cualé numerous trenches were dug in which thousands of kilograms of hoppers were buried.

North Quanza District. — A detachment of 70 men of the 6th company of native troops, supplemented by some hundreds of natives recruited by the local authorities and in part supplied by the farmers of the neighbourhood, combated the invasion in the area of Lucala, destroying about 10,000 kg. of adults.

South Quanza District. — In the post of Conda, in the civil circumscription of Seles large numbers of hoppers were destroyed on the slope of the Angelo Cordillera and further destruction on a large scale took place at the foot of the Sierra Conda Cotomba.

Numerous hopper bands were destroyed by means of flame-throwers in Ande, Cangombe, Cunda, Quipombo, Huambo and Aguas Quentes.

Some 400 natives were lent by the local authorities for the destruction of the pest which attacked an agricultural holding in Nhime.

Close to the high road at Conda-Cotomba 500 kg. of adults were destroyed, as also several hundred kilograms in the vicinity of the River Conda.

In the civil post of Amboiva small swarms were destroyed, as well as some bands in Dumbi. In the post of Botera the local authorities assisted on different occasions in the protection of private holdings against the invasions of locusts and succeeded in destroying several swarms. Several thousand kilograms of adults were destroyed in Cassombe.

In the circumscription of Novo Redondo some thousand natives partially destroyed a large swarm which settled on the holding of Buenaventurança. Owing to their assistance no serious damage was inflicted by the insects.

In the post of Quimba, circumscription of Amboim, the following measures were taken for the destruction of the pest: a hopper band which covered an area of approximately 3 km. was totally destroyed by fire on 28 February in Dande-Angolo; on 2 March the larger part of a swarm which extended over approximately 6 km. was almost exterminated in the region of Nhama; a swarm

extending over 4 km. was also destroyed in Bimbe, by means of fire; in Quipuco trenches were dug measuring about 250 m. in length, in which a band was buried; in Cabonzé, 250 natives destroyed 8 sacks of adults which had devastated an area of some 7 km.

Moxico District. — In this district the 8th company of native infantry were utilised to aid the civil authorities in the anti-locust campaign. In the circumscription of Fronteira do Cuando, according to information received, it is impossible to exterminate the pest entirely, owing to the large numbers of insects which have appeared and the lack of the necessary labour.

Huila District. — During the month of February 6,957 kg. of hoppers were destroyed in the Chibia circumscription. In the following month the destruction increased to 75,952 kg. In the Gambos circumscription the campaign against locusts in all stages of development continued, 500 kg. of eggs being destroyed, while in the posts of Pocolo. Otchinjau and Canama the destruction was not below this figure. In the frontier circumscription Baixo Cunene all the hoppers which infested the towns of Chicuco, Calundo and Chicongue were exterminated while great activity in locust control was displayed in N'giba, Cafina and Melunga.

Lunda District. — In the posts of Luremo, Caluango and Cuango, in the Camaxilo circumscription many campaigns were undertaken against both hoppers and adults. In the post of Cuango 54 ditches were made in which were buried thousands of insects in the fourth stage. In the plantations the campaign against adults was not easy.

Eritrea: Locusts (1).

During June 1934 no eggs, hoppers or swarms of locusts have been reported in the Colony.

Madagascar: Phytopathological Notes (2).

COFFEE.

Hemileia vastatrix. — An experiment in control of *Hemileia vastatrix* Berk. et Br., which constantly attacks the arabica coffee plant in many parts of Madagascar, was begun in October 1931 in the centre of the Island (1,400 to 1,500 metres above sea level).

Satisfactory results have been given by the use of copper sprays (Bordeaux mixture with addition of skimmed milk and rosin) containing 1.5 per cent. of copper sulphate. Three applications at a total cost of about 0.30 fr. per plant were enough to save the coffee plants. This form of treatment, during the rainy season, is becoming general among the European and native planters.

(1) Communication from Dr. Luigi MASSA, Acting Chief of the Agricultural Bureau of Eritrea, transmitted to the Institute by the Government of the Colony.

(2) Communication from the official correspondent of the Institute, Mr. G. BOURIQUET, Director of the Laboratory of Plant Protection, Nanisana, Antananarivo.

Root rot. — Along the whole of the east coast of the Island, a scale insect, *Lachnodius greeni* Vayss., in association with a fungus, is causing serious damage in certain plantations. In the absence of fructification, the fungus has not been identified; it seems, however to differ from *Polyporus coffeae* Wak., which especially in Africa is sometimes associated with *Pseudococcus lilacinus* Ckll., and does damage of the same kind.

CASSAVA.

The fungus giving rise to root rot in cassava, which was referred, by mistake, to the genus *Phellinus* in the previous list [see this *Bulletin*, 1932, No. 7, p. 106] is, in reality, *Phaeolus manihotis* Heim.

SUGAR CANE.

In September 1933, the presence of sugar cane mosaic was noted at Mayotte (Archipelago of the Comoro Islands). The absence of this disease in the rest of the territory has made desirable administrative intervention [see this *Bulletin*, 1934, No. 3, p. 56].

TOBACCO.

'Crinkling'. — The plants called by the natives 'Tabac boka' (leprous tobacco) have the same characteristics as the plants attacked by 'Crinkling', an affection known in Rhodesia. As in that country, a relation has often been observed between the appearance of the symptoms of the trouble and the presence, inside the stalks, of a caterpillar of the potato tuber moth (*Phthorimaea operculella* Zell). Sometimes, when the larva is absent, borings are found choked by a mass of cells.

'Kroepoek'. — In the neighbourhood of Antananarivo, a tobacco disease exists which seems to be identical with 'Kroepoek'.

Mozambique: Locust Movements (*Nomadacris septemfasciata* and *Locusta migratoria migratorioides*) (1).

Cabo Delgado District. – During the first week of April 1934 the campaign against hoppers was continued in all the circumscriptions. The regions of Mumo and Muidumbe were declared to be infested.

The first swarm was observed in Ocua during the second week of April, proceeding towards the north. Another swarm passed Palma in the direction of Tanganyika.

The campaign was continued with mechanical methods during the third week of April. Movements of locusts were already noted in Luria, the swarms coming from Montepuez and Ancuabe. At the end of the month swarms passed near Mecufi in the direction of Muave and Nangadi, soon proceding towards the

(1) Communication from Mr. Jorge Gardé ALFARO CARDOSO, Head of the Entomological Section, Lourenço Marques, transmitted to the Institute by the Directorate of the Agricultural Services of the Colony.

north. In nearly all the circumscriptions the locust is developing wings and continues to damage some of the native cotton.

Nyassa District. – The pest is found in the low-lying regions in the vicinity of Lakes Amaramba and Chirua, having moved towards Mecanhelas. Great mortality has been observed among the locusts and it is concluded that an epidemic must have occurred.

Tete District. – In Moravia 1,593 hopper bands were destroyed by chemical means. From Macanga is repported the destruction of eggs and also of several bands, and the posts of Cazula, Chuiza and Zobue have been cleared of locusts, as also the regions of Chirembue, Incamiala, Tambelhule, Chambane, Incari, Temanpine, Sinjal and Manuda, of the circumscription of Mutarara. Swarms from the eastern regions flew in the direction of Nyasaland. Ankuaze has been invaded by enormous swarms, severe damage being inflicted on the Mozambique Company's farms in spite of the fact that a very active control campaign has been carried on. On 3 April an enormous swarm coming from the territory of the Mozambique Company passed Charre, causing considerable damage, and proceeded towards the frontier. Five large swarms passed Mungari, Barué circumscription, in a south-easterly to westerly direction.

Mozambique District. – The hoppers, chiefly found along the entire coast, were successfully controlled in Angoche, Moma and Megovelas. The majority of them have reached the adult stage and fly in various directions.

The majority of the swarms appear between Mossuril and Mecenta. Large swarms have appeared in Megovelas and Imala, flying low in various directions. They have caused considerable damage to the maize and cotton crops.

Quelimane District. – In the circumscriptions of Milange and Massingire the death of large numbers of insects was observed, presumably due to a species of Diptera.

Inhambane District. – In March the whole district was infested with hoppers in various stages. The gangs of workers continue their activities in all the circumscriptions and the campaign is carried on chiefly through spraying with sodium arsenite.

In some circumscriptions, particularly Vilanculos, Massinga, Morrumbene and Hemoine several swarms have been observed and many plantations have been destroyed. On 8 April a swarm coming from Chibuto passed Maú-ele, circumscription of Panda, and has been destroyed.

On the 9th another swarm passed the same neighbourhood in an easterly direction. Movements of fresh swarms have been noted in various circumscriptions.

Lourenço Marques District. – On 21 April an enormous swarm passed over Manjacaze, proceeding in the direction of Chicomo, where it destroyed 4 hectares of cotton and 2 of maize. On the 27th a large and compact swarm settled on the Congolo region, devouring all the vegetation and afterwards proceeding from south-east to north-east.

On the 16th and 17th April two enormous swarms passed the post of Saute, Guija circumscription. They came from Marvume and proceeded towards the north. Large swarms have appeared in Dindiza and Chabane. In Chibuto and Changuene the campaign against the hoppers has been interrupted owing to floods.

The regions of Chinhahguanine, Massintoto and Chinonguine, Magude circumscription, were covered with insects. On the 24th a swarm 15-18 km. long and 5 km. wide passed Massintoto.

In the Sabié circumscription small swarms were observed almost daily coming from both sides of Krüger Park and flying towards the banks of the Incomati where they united. All the plantations on the west bank of the Incomati have been destroyed. At the end of April a band in the second stage appeared close to Moamba, which was devastated. From the hills of the Serra dos Libombos, as also from the adjacent country, the greater number of the swarms have departed, flying along the rivers Incomati, Umbeluzi, Impamputo and Maputo. These movements do not take a fixed direction. In Catuane, Maputo circumscription, the locusts disappeared from the beginning of April, equally in the Portuguese territory as in Swaziland and Natal, which caused the suspension of the work carried on by the Portuguese gangs and by the Union of South Africa. Later, however, the locusts returned, coming apparently from Libombos.

On 5 February an enormous swarm coming from Intimane settled on Manhica and was attacked with flame-throwers. On 12 April two swarms from Pinheiro and Catarino settled and were also combated by flame-throwers. Another swarm settled on Mujuel. Small swarms were controlled on the plantations of Martins de Azecedo. On 17 April three swarms were seen in Manhica, passing from south to north.

Summing up it may be said that the swarms coming from the west are found mainly along the rivers, moving without fixed direction. A hopper band was observed to be attacked by a species of *Sarcophagidae*, which was destroying large numbers. Some specimens of this species were also met with among locusts coming from Moamba.

Mozambique Company. – In the circumscription of Sena enormous swarms crossed the Zambesi from north to south, while others flew in no settled direction, causing damage to the crops. In Mareneu the swarms caused a certain amount of damage to the sugar cane and to the native crops. In Chemba large swarms were observed; flying in no fixed direction, destroying the crops, considerable mortality, due to parasites, being observed in these swarms. This applies also to the Cgeringoma circumscription. The Gorongoza circumscription was invaded by swarms which caused some damage.

During the last days of April the town of Beira was invaded by a large swarm from the north which soon flew in a north-easterly direction. The Gorongoza circumscription was also invaded by large swarms, the crops suffering in consequence. Great mortality was observed among the hoppers, probably due to a fungus.

Chimoio was invaded by enormous swarms from the north and west which caused some damage. In Buzi there are large bands as also in Sofala. The injury caused by them is considerable.

In Massurize the locusts which had just reached the adult stage flew in a south-easterly direction. A large quantity of adults was noted in Govaro, as well as many hoppers, and some damage was caused by them. In the Mucoque circumscription much smaller swarms exist at various points.

Southern Rhodesia : Locust Invasion, 1932-1934 (1).

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Red Locust (*Nomadacris septemfasciata*).

A few belated Red Locust hoppers were reported during the earlier part of the month but this species is now generally in the winged stage and the anti-hopper campaign has come to an end.

Flying swarms have been prevalent all over the Colony. Many large swarms are reported to have entered the Colony from Portuguese East Africa, and this invasion showed little or no sign of abating by the end of the month.

The flying swarms have been moving about much more freely than during March. Movements in all directions have been reported and it is difficult to extract from the reports any evidence of definite migration. The impression is, however, that the general trend of movement has been in a direction with a westerly element.

Salisbury and neighbourhood have been visited by dense swarms on several occasions during the month.

Tropical Migratory Locust (*Locusta migratoria migratorioides*).

Some of the swarms which entered the Colony from Portuguese East Africa were found to consist of a mixture of the Red Locust and Tropical Migratory species. Individuals of the latter species examined at Salisbury were found to have eggs considerably developed, and egg laying was definitely reported in the Victoria District. The eggs were submitted to the District Controller of Locust Operations, but unfortunately were not forwarded to Salisbury. It appears quite unlikely that hoppers can mature this season from eggs laid so late on account of the falling temperature and humidity. The fate of the deposit, therefore, is uncertain. No hoppers were recorded from any eggs which may have been laid by this species late last season. The impression is that the Tropical Migratory Locust can only rear one generation *per annum* in S. Rhodesia, and that any second generation must be reared in warmer and probably more humid country outside our borders. It is possible that the swarms in general leave the colony after the first generation has obtained wings. In any case swarms of this species have not been in evidence after March during the past two seasons.

(1) Communication from the official correspondent of the Institute, Mr. Rupert W. Jack, F. E. S., Chief Entomologist, Department of Agriculture, Salisbury, Southern Rhodesia.

Enemies and Disease.

No reports have been received nor observations made concerning any concentration of birds on the locust swarms.

A few instances of infestation with threadworms and Dipterous parasites have come to notice.

The locust fungus *Empusa grylli*, has been recorded and has apparently caused considerable mortality amongst individual swarms in various parts of the colony.

Damage.

The main maize crop of the country has definitely been saved from both hoppers and fliers, and a normal crop is anticipated. Individuals have, however, suffered more or less severe loss during the outbreak. Various farmers who grow a relatively small acreage of maize for consumption on the farm, have lost a considerable portion of their crops.

Damage to late maturing native crops by winged swarms is reported to be considerable in certain districts.

Outlook.

Whilst there are certain agencies at work, particularly the locust fungus *Empusa grylli*, which, under favourable conditions, are capable of a vast amount of destruction amongst the locusts, it cannot be said that at present there is any definite indication of an early abatement of the present swarm cycle of the Red Locust. It appears probable that a large number of swarms will be prevalent in the Colony, at least until the anticipated pre-breeding southward migration in the spring.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany. — In accordance with Ministerial instructions of 15 March 1934, nuts of all kinds (walnuts [*Juglans regia*], hazel nuts [*Corylus avellana*], Brazil nuts [*Bertholletia excelsa*], etc.), imported in the dried state, are exempted from the regulations for prevention of the introduction of the San-José scale [*Aspidiotus perniciosus*]. They must, however, be imported by the customs offices authorised to import fresh fruit. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Juni 1934, Bd. VI, Nr. 3, S. 42).

*** In accordance with Ministerial instructions of 27 March, 9 April and 15 May 1934, imported oranges, tangerines, and lemons must be subjected to inspection in regard to the San José scale if the consignments come from countries known to be infested by this parasite. Consignments from countries not infested, or from Spain, are not subject to these regulations. These fruits must be imported by the customs offices expressly authorised to import fresh fruit. (*Ibid.*).

*** By a Ministerial Regulation of 19 April 1934 it is decided that the measures introduced as a precaution against the San José scale do not apply to

cut flowers, bouquets and wreaths carried by travellers and intended for family festivals, religious ceremonies, etc., and not for commercial purposes. (*Ibid.*, S. 43).

*** As it was proved that too severe a test was prescribed for ascertaining whether, after disinfection by hydrocyanic acid, the last trace of toxic gas had disappeared, the Minister of Agriculture modified the regulations on this subject by a Circular dated 9 May 1934, by which their severity was relaxed. The colorimetric method is rendered more accurate by the use of small colour scales for comparison. A distinction is made between premises used for residential purposes and those devoted solely to purposes of trade. The latter may be again utilised as soon as the remains of toxic gas have reached a degree of concentration which renders them practically inoffensive, although it may still be possible to detect them by analytical methods. (*Ibid.*, S. 43-44).

Germany (**Prussia**). — By Police Ordinance, dated 9 January 1934, for the protection of bees, it is forbidden in the district of Erfurt, province of Saxe, to spray flowering fruit trees with arsenical compounds.

Such sprays may be used on trees situated at a distance of at least 100 metres from the nearest hives only in the evening and in agreement with the owner of the bees. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Mai 1934, Bd. VI, Nr. 2, S. 36-37).

*** A similar Ordinance, dated 14 March 1934, also forbids spraying flowering fruit trees with arsenical compounds in the district of Potsdam, province of Brandenburg, and fixes 50 metres as the radius within which it is necessary to take the above precautions in spraying trees. (*Ibid.*, S. 36).

*** Regulations published on 24 February 1934 are concerned with the application of the Game Law of 18 January 1934. The latter Law annuls the local regulations hitherto in force and contains and renders generally applicable all those found satisfactory in practice and in particular those of the Decree of 10 March 1933 on the protection of animals and plants [see this *Bulletin*, 1933, No. 8, p. 188].

The wild rabbit has been included among game animals; owing to the damage caused by rabbits to crops and forests no close season is prescribed.

It is forbidden to set at liberty any animal of which the excessive multiplication is undesirable for the sake of agriculture. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. April 1934, Bd. VI, Nr. 1, S. 6-12).

Germany (**Thuringia**). — By Decree of 5 April 1934 the Decree of 22 September 1930 concerning the control of the potato eelworm [*Heterodera schachtii* f. *solani*] [see this *Bulletin*, 1931, No. 3, p. 42] has been modified.

Potatoes grown on infected land may not be used for planting on non-infected land.

It is forbidden to plant several seasons in succession on infected land and land in its vicinity potatoes, tomatoes and other plants capable of infestation

by the eelworm. The Ministry will establish the number of years which must intervene between two successive crops of potatoes.

The Ministry is authorised to extend these regulations to non-infected districts and may also forbid the movement of herds and flocks through infected regions. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Mai 1934, Bd. VI, Nr. 2, S. 37-38).

*** By Police Ordinance, dated 25 April 1934, it is ordered that in the circumscription of Weimar the parts of fruit trees and bushes attacked by woolly aphis [*Eriosoma lanigerum*], scale insects, aphides, 'Frostspanner', [*Geometridae*], 'Gespinstmotten' [*Yponomeutidae*] and scab [*Fusicladium*] must be thoroughly cleaned. Dead or dying fruit trees and those so seriously attacked that successful treatment is doubtful must be removed with the upper parts of their roots. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Juni 1934, Bd. VI, Nr. 3, S. 50).

Brazil. — By Presidential Decree No. 24.114 of 12 April 1934 the regulations for phytosanitary protection of crops are approved. (*Diário Oficial*, Rio de Janeiro, 4 de maio de 1934, ano LXXIII, n. 101, pags. 8514-8523).

Belgian Congo. — By Decree No. 21 of 16 February 1934 of the Commissary of the province of Elisabethville, a locust invasion in the province is declared to be a public disaster.

Any holder (individual or collective) of land on which eggs have been deposited or on which hoppers or adults have made their appearance is required immediately to notify the nearest Government authority.

The Government authority receiving notice of a locust invasion shall order the application of the following control measures: collecting and burning eggs, crushing and destroying hoppers in ditches, collecting and destroying adults at dawn when they are stupified by dew and incapable of flight.

It is strictly forbidden to drive hoppers, attempt to drive them or allow them to be driven towards neighbouring land. (*Bulletin Administratif du Congo Belge*, Léopoldville, 10 mars 1934, 23me année, nº 5, p. 171-172).

Danzig. — By Decree of 2 May 1934 the regulations concerning the obligatory colouring with eosin of seed of clover, lucern, kidney vetch and sweet clover, in force in Poland, have been adopted also for the territory of the Free City of Danzig. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1934, 14. Jahrg., Nr. 6, S. 63).

Italy. — A Ministerial Decree of 14 July 1934 fixes the phytosanitary regulations for the temporary importation from abroad of potato varieties to be used as seed for the 1934-1935 agricultural season. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 20 luglio 1934, anno 75º, n. 169, pp. 3351-3353).

Morocco (French Zone). — By Decree of the Director of Waters and Forests, dated 16 February 1934, owners or holders of land in the territory of Ouezzane, region of Fez, are authorised to destroy wild boars on their land at

any time and by any means except fire. (Empire Chérifien. Protectorat de la République Française au Maroc. *Bulletin Officiel*, Rabat, 2 mars 1934, XXIII[e] année, n° 1114, p. 196).

*** By Vizirial Decree of 3 March 1934 (16 kaada 1352) taxes may be collected for the benefit of the State on any work done in the laboratory by the agents of the Plant Protection Service for the purpose of ascertaining the efficacy of insecticide and fungicide treatments, if effected by them on account of private persons or associations, or if the work is done by private individuals on their own account. (Empire Chérifien. Protectorat de la République Française au Maroc. *Bulletin Officiel*, Rabat, 6 avril 1934, XXIII[e] année, n° 1119, p. 295).

*** A Decree of the Director General of Agriculture, Commerce and Land Settlement, dated 27 March 1934, fixes the rate of the charges to be paid for cost of laboratory work or of ascertainment of mortality, as the result of treatment carried out by the Plant Protection Service, and determines the conditions in which the samples must be taken. (*Ibid.*, p. 295-296).

*** A Decree of 30 March 1934 authorises the destruction of rabbits causing damage to crops in certain regions of Meknès. (Empire Chérifien. Protectorat de la République Française au Maroc. *Bulletin Officiel*, Rabat, 13 avril 1934, XXIII[e] année, n° 1120, p. 314-315).

*** By Decree of 20 April 1934, the Decrees of 11 September and 18 December 1933 [see this *Bulletin*, 1933, No. 12, p. 275, and 1934, No. 2, p. 39] authorising owners or holders of land in certain regions of the civil control of the Zemmour, region of Rabat, to destroy on their land by any method rabbits causing damage to their crops, are annulled. (Empire Chérifien. Protectorat de la République Française au Maroc. *Bulletin Officiel*, Rabat, 27 avril 1934, XXIII[e] année, n° 1122, p. 383).

Yugoslavia. — By Ministerial Notification No. 4561/11 of 31 January 1934, the following countries are declared free from potato wart disease (*Synchytrium endobioticum*), Colorado beetle (*Leptinotarsa decemlineata*) and potato moth (*Phthorimaea operculella*): — Italy, Greece, Rumania, Spain (except the Canary Islands), Turkey, Hungary, Bulgaria, Estonia, Latvia and Albania. (*Deutsches Handels-Archiv*, Berlin, 15. Juni 1934, 88. Jahrg., 2. Juniheft, S. 2196).

*** By Decree No. 8971/11 of 15 February 1934, it is allowed as an exceptional measure to utilise small waterproof paper bags and strong cardboard boxes for packing fungicides and insecticides, provided that the quantities do not exceed the following weights: 500 g. in the case of fungicides, 10 kg. for insecticides. The ruling holds that larger quantities of these products must be put on the market only in metal or glass containers. (*Deutsches Handels-Archiv*, Berlin, 1. Juni 1934, 88. Jahrg., 1. Juniheft, S. 2033).

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